MARICOPA COUNTY AIR QUALITY DEPARTMENT
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Draft

REQUIREMENTS, PROCEDURES AND GUIDANCE IN SELECTING BACT and RACT

1. GENERAL

Maricopa County Air Quality Department (MCAQD), Rule 241 Section 300, specifies Best Available Control Technology (BACT) and Reasonably Available Control Technology (RACT) requirements for new sources and modifications to existing sources of air pollution requiring permits or permit revisions.

2. APPLICABILITY

This policy applies to all stationary sources of air pollution within Maricopa County.

Exemption:
The Provisions of Rule 241 do not apply to new major sources and major modifications to existing major sources subject to the requirements of MCAQD Rule 240.

3. BEST AVAILABLE CONTROL TECHNOLOGY (BACT) – RULE 241 §301

BACT is defined as the most stringent limitation or control technique that is technologically feasible, cost-effective and has been achieved in practice for such emissions unit and class of source. The control equipment or technology must be commercially available, and have been demonstrated to be effective and reliable on a full scale unit and shown to be cost-effective on a dollars-per-ton of pollutant removed basis. The term "achieved in practice" applies to the most effective emission control device already in use, or the most stringent emission limit achieved in the field for the type and capacity of equipment comprising the source under review and operating under similar conditions.

301 BEST AVAILABLE CONTROL TECHNOLOGY (BACT) REQUIRED: An applicant for a permit or permit revision subject to Rules 210, 220, or 230 shall apply BACT for each pollutant emitted which exceeds any of the threshold limits set forth in any one of the following criteria:

301.1 Any new stationary source which emits more than 150 lbs/day or 25 tons/year of volatile organic compounds, nitrogen oxides, sulfur dioxide, or particulate matter; more than 85 lbs/day or 15 tons/year of PM10; or more than 550 lbs/day or 100 tons/year of carbon monoxide.

301.2 Any modified stationary source if the modification causes an increase in emissions on any single day of more than 150 lbs/day or 25 tons/year of volatile organic compounds, nitrogen oxides, sulfur dioxide, or particulate matter; more than 85 lbs/day or 15 tons/year of PM10; or more than 550 lbs/day or 100 tons/year of carbon monoxide. BACT is only required for the sources or group of sources being modified.

303 CIRCUMVENTION: The submission of applications for permits or permit revisions for new or modified sources in phases so as to circumvent the requirements of this section is prohibited. The burden of proof to show that an application for a permit or permit revision is not being submitted as a phase of a larger project shall be upon the applicant. A person shall not build, erect, install, or use any article, machine, equipment, condition, or any contrivance, the use of which, without resulting in a reduction in the total release of air contaminants to the atmosphere, conceals or dilutes an emission which would otherwise constitute a violation of this section. A person shall not circumvent this section to dilute air contaminants by using more emission openings than is considered normal practice by the industry or by the activity in question.

BACT requirements apply to either NEW or MODIFIED sources.

- NEW STATIONARY SOURCE: Per Rule 100.200.67 and 100.200.47, a new source is defined as any facility that existed after the initial adoption of the rule. The BACT Rule 241 was adopted on July 1, 1988. Any facility that existed after that date is considered "new" for the purpose of the applicability analysis.

- MODIFIED STATIONARY SOURCE: Once a facility has been permitted, any proposed modifications to the facility may be subject to BACT requirements if the proposed modification (not the entire source) is above the BACT threshold. The terms modification and major modification are defined in Rule 100 (Sections 200.59 and 200.65) and the Department will use both definitions for the purposes of determining whether the BACT requirement becomes applicable to a source due to a facility change. A source that has engaged in a physical modification such as the installation of new equipment or addition of a new facility is generally accepted as a modified stationary source. BACT applicability is evaluated for each modification individually and only applies to the source(s) being modified. Sources are not allowed to circumvent BACT requirements by dividing the modification into separate permit applications (Rule 241, Section 303).

4. SOURCE OBLIGATION

A Permittee may accept legally and practically enforceable limits on the operation of their source in order to restrict emissions to below the BACT thresholds and avoid imposition of BACT.

At such time as the applicability of any requirement of Rule 241 would be triggered by an existing source, solely by virtue of a relaxation of any enforceable limitation on the capacity of the source to emit a pollutant, then the requirements of Rule 241 will apply to the source in the same way as they would apply to a new or modified source otherwise subject to the Rule.

5. REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT)

The Department requires all sources to apply RACT until the emission level reaches the appropriate BACT thresholds.

Rule 241 Section 302, provides for the following RACT requirements:

302 REASONABLY AVAILABLE CONTROL TECHNOLOGY (RACT) REQUIRED: An applicant for a permit or permit revision for a new or modified stationary source which emits or causes an increase in emissions of up to 150 lbs/day or 25 tons/yr of volatile organic compounds, or particulate matter; up to 85 lbs/day or 15 tons/yr of PM10; or up to 550 lbs/day or 100 tons/yr of carbon monoxide shall apply RACT for each pollutant emitted from said new or modified stationary source.

RACT requirements apply to both NEW or MODIFIED sources (definitions of NEW and MODIFIED sources are provided above).

Before the source reaches the appropriate BACT thresholds, all sources are required to comply with Regulation III of the MCAQD Rule and Regulations. The 300 series Maricopa County Rules under Regulation III are considered to be RACT requirements. **The Department has the primary responsibility to evaluate the source's proposed facility and operations in order to make a determination of compliance with RACT standards.**

For sources not subject to Regulation III, RACT determination may be made in accordance with MCAQD Regulation, Rule 100 Section 200.90 which states "*RACT for a particular facility, other than a facility subject to Regulation III of these rules, is determined on a case-by-case basis, considering the technological feasibility and cost-effectiveness of the application of the control technology to the source category*".

6. DETERMINATION OF EMISSION LEVEL

The source shall present an emission analysis using the following guidelines in order to determine whether the future emissions increase will trigger BACT requirements.

EMISSION INCREASE EVALUATION

The increase in emissions shall be calculated using the Potential To Emit (PTE) for each new source or modification to an existing source. PTE is defined in Rule 100 §200.85 as:

200.85 POTENTIAL TO EMIT: The maximum capacity of a stationary source to emit pollutants, excluding secondary emissions, under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design, if the limitation or the effect it would have on emissions is federally enforceable.

PTE may take the following into account:

- A RACT / BACT controlled emission level; or

- An emission level based on the use of a control device that is either part of the design or installed as an add-on control of the subject emission source, provided the requirement for the use of such control device and the effect on the reduction of emissions are incorporated into an enforceable permit condition; or

- An emission level based on restrictions such as physical, material, production and/or operational limitations that are incorporated into the permit as enforceable permit conditions.

Increase in Emissions = (PTE) – (Actual Emissions)

For a new, stand-alone unit or source, the emissions increase is simply the PTE of the subject unit (Actual Emissions = 0 prior to the modification), or the allowable emissions (as agreed by the source).

For a limited modification of the existing unit or facility, the potential emissions increase will be calculated for that unit or facility alone.

If the modification/change is linked closely to other existing areas of the facility, the emissions need to be evaluated for all of the affected point sources. Keep in mind that the change must have a direct relationship to increased emissions in other areas. This can happen by either a debottleneck effect or if the modification can increase the utilization of another process line. The facility must show an analysis by quantifying the emissions increase in the entire affected area due to the modification.

- The "increase in emissions" shall be calculated by comparing the difference in emissions from "actual" before the modification/change to potential to emit (PTE) after the modification/change. The "PTE" may be substituted by new allowable emissions if the terms of the enforceable permit conditions are agreed to by the source.

- The fugitive emissions of a stationary source shall not be considered in determining whether it is subject to Rule 241 unless the source belongs to one of the categories of stationary sources in **Appendix A** of this policy.

- The "actual emissions" (Rule 100.200.3) are the average rate, in tons per year, of emissions during a period of two calendar years preceding the date when the permit revision for the proposed modification is submitted. As a policy, the Department will use the more representative of the averaged value of either of the following two emissions data as the past actual emissions:

    - The prior most recent two years of emissions inventory on file; or
    - Rolling total of the most recent 24 months.

- The Control Officer may allow the use of a different time period upon a demonstration that it is more representative of normal source operation.

- If a source asserts that a proposed modification is below the BACT trigger threshold, the source must include in their application a summary of all prior modifications within last 5 years. The

source must demonstrate that the proposed modification is not part of a larger project that would be subject to BACT. Applicants are prohibited from circumventing BACT requirements by submitting applications for permits or permit revisions in phases. The burden of proof to show an application "for a proposed modification is not being submitted as a phase of a larger project" shall be upon the applicant per Rule 241.303.

- Emission increases from all permit modifications shall be documented by the Permit Engineer as part of the Department's technical evaluation.

DATA COLLECTION OF ACTUAL EMISSIONS:

As a policy, the Department will use the emissions data submitted in the prior emissions inventory on file as default actual emissions. If necessary, the Department may choose the emissions rate that is the lowest as calculated by the following methods:

Annual Emissions Trigger:

- The average of the actual emissions as submitted and accepted to the Department Emissions Inventory Unit for the most recent two calendar years; or
- If 12 month rolling total emissions monthly reports are available, the averaged emissions calculated from the most recent 2 calendar years; or
- The most recent emissions calculation from the Department approved performance tests result as available; or
- The emissions calculation from other available records upon the Department's request; or
- The Control Officer may allow the use of a different time period upon a demonstration that it is more representative of normal source operation.

Daily Emissions Trigger:

When the daily trigger is used in determining whether BACT requirements apply, the Department will use the largest differential in emissions result from any of the following methods unless noted otherwise:

- The differential of the lowest actual emissions of any day (if actual daily emissions records are available within last 5 years) to the future daily emissions calculated from the PTE (or the yearly allowable emissions agreed by the source divided by the proposed operating days per year); or
- The largest differential of the daily emissions (calculated from the monthly emissions records divided by the operating days per that month) to the future daily emissions calculated from the PTE (or the yearly allowable emissions agreed by the source divided by the proposed operating days per year); or
- The largest differential of the daily emissions (calculated from the yearly emissions records divided by the operating days per that year) to the future daily emissions calculated from the PTE (or the yearly allowable emissions agreed by the source divided by the proposed operating days per year).

7. TOP-DOWN BACT ANALYSIS

The source (not the Department) shall conduct a BACT analysis for each pollutant which exceeds the BACT threshold. **Once BACT is triggered, the source has the primary responsibility to**

research control options on a nationwide basis and present a complete BACT top-down/cost analysis for the Department's review and approval.

The selection of BACT should address the control of each emission point for the subject pollutant at a facility or the affected area in the case of modification. The Department's final determination of BACT will be performed on a case-by-case basis considering energy, environmental, and economic impacts and other costs.

The following steps shall be documented in the top-down analysis:

1. **Step 1 – Identify All Control Technologies**
   The first step in a top-down analysis is to identify, for the emissions unit in question, all "available" control options ranked in descending order of effectiveness. Available control options are those air pollution control technologies or techniques with a practical potential for application to the emissions unit and the regulated pollutant under evaluation.

2. **Step 2 – Eliminate Technologically Infeasible Options**
   In the second step, the technological feasibility of the control options identified in Step 1 is evaluated with respect to the source-specific or emissions unit-specific factors. To exclude a control option, a demonstration of technical infeasibility must be clearly documented and should show, based on physical, chemical, and engineering principles, the technical difficulties would preclude the successful use of the control option for the emissions unit under review.

3. **Step 3 – Rank Remaining Control Technologies by Control Effectiveness**
   All remaining control alternatives not eliminated in Step 2 must be ranked and then listed in order of overall control effectiveness for the pollutant under review, with the most effective control alternative at the top. A separate list should be prepared for each pollutant and for each emissions unit subject to the BACT requirement. The list should present the array of control alternatives and should indicate the effectiveness of each alternative. The list should also indicate if the alternative has been achieved in practice for the class and category of source in question.

4. **Step 4 – Cost Effectiveness Analysis**
   After the identification of available and technologically feasible control options, economic impacts are considered to arrive at the final level of control. After performing a cost effectiveness analysis, in accordance with the procedures outlined below, control options that are not cost effective may be eliminated from consideration upon approval by the Department.

   The Annualized Cost Method: EPA, SJVUAPCD and BAAQMD use the following method to calculate the Control Cost for pollutant removal:

   1. Calculate an equivalent annual cost from a capital cost using a capital recovery factor as shown below:

$$A = P \times \frac{i \times (1+i)^n}{(1+i)^n - 1}$$ where;

A = Equivalent Annual Control Equipment Capital Cost

P = Present value of the control equipment, including piping, instrumentation, electrical, structural design and start up cost, etc.

i = Interest rate (use 7%, or demonstrate why alternate is more representative of the specific operation).

n = Equipment life (assume 10 years or demonstrate why alternate is more representative of the specific operation).

2. Determine annual operating cost (labor, fuel, maintenance, utilities, etc.).

3. Calculate the Total Annual Cost by summing the equivalent annual control equipment cost and the annual operating cost (steps 1 and 2 above).

4. Calculate the Control Cost by dividing the Total Annual Cost (step 3 above) by the tons of pollutants controlled per year.

$$\text{Control Cost}\left(\frac{\$}{\text{ton}}\right) = \frac{\text{Total Annual Cost}\left(\frac{\$}{\text{yr}}\right)}{\text{Tons of Pollutants Controlled}\left(\frac{\text{tons}}{\text{yr}}\right)}$$

5. **Step 5 – BACT Selection**
   The source shall select/apply the top-ranked control technology as the BACT unless the applicant demonstrates, and MCAQD agrees, that technical considerations, or energy, environmental, or economic impacts justify a conclusion that the most stringent technology is not achievable in that case. If the most stringent technology is eliminated in this fashion, then the next most stringent alternative is considered, and so on.

8. ALTERNATIVE TO BACT TOP-DOWN COST ANALYSIS

To streamline the BACT selection process, the Department will accept a BACT control technology for the same category of industry as listed by the South Coast Air Quality Management District (SCAQMD), San Joaquin Valley Unified Air pollution Control District (SJVUACD), or the Bay Area Air Quality Management District (BAAQMD), or other regulatory agencies accepted by the Department as a viable alternative. Sources who opt to select control technology for the same or similar source category accepted by the air quality management districts in California may forgo the top-down analysis described above.

A list of BACT resources for air quality management districts in California are listed below:

- Bay Area Air Quality Management District
  http://www.baaqmd.gov/pmt/bactworkbook/default.htm
- San Joaquin Valley Air Pollution Control District

http://www.valleyair.org/busind/pto/bact/bactidx.htm
- California Air Resources Board
  http://www.arb.ca.gov/bact/bact.htm

9. APPLICABILITY OF BACT CONTROL TO LESS EFFECTIVE EMISSIONS POINTS

BACT control shall apply to all emissions points of the triggering pollutant emitted from the new or modified emissions unit. If the overall costs to control every emission point become prohibitive, the source shall include calculations in the cost analysis to justify whether the elimination of certain emissions points make the project feasible. The Department will take this cost effectiveness value under consideration in determining whether emissions points can be eliminated from the overall BACT control system.

The formula of "THE COST EFFECTIVENESS ANALYSIS FOR THE UNCONTROLLED PORTION" is shown in the following equation:

$$V = \frac{W - X}{Y - Z}$$

Where:

V = Dollars per Ton (Uncontrolled Portion) of Pollutant
W = Annualized Cost of Controlling All Emissions Points
X = Annualized Cost of Controlling the Selected Emissions Points
Y = Total Tons Removed from All Emissions Points
Z = Tons Removed from the Selected Emissions Points

10. BACT IMPLEMENTATION PLAN

In addition to the information required by Sections 1-9 above, the source shall prepare and present a **BACT Implementation Plan** for the Department's approval. This plan shall include:

- Individual emissions calculations for each emissions point that contribute to the BACT threshold exceedance.
- Identification of all emission points to be routed to the control system.
- If one or several emissions points are to be eliminated from control, the justification of such elimination must be provided.
- The BACT top-down or alternative control analysis.
- The expected effectiveness of the selected control in terms of emissions capture and destruction or control efficiency.
- Process design parameters for the control device.
- The control device installation plan and timeframe.

APPENDIX A

The following categories of stationary sources shall consider fugitive emissions in determining whether they are subject to Rule 241.

Fugitive emissions are those "...which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening." To the extent they are quantifiable, fugitive emissions are included in the potential to emit (and increases in same due to modification), if they occur at one of the following stationary sources:

- Coal cleaning plants (with thermal dryers)
- Kraft pulp mills
- Portland cement plants
- Primary zinc smelters
- Iron and steel mills
- Primary aluminum ore reduction plants
- Primary copper smelters
- Municipal incinerators capable of charging more than 50 tons of refuse per day
- Hydrofluoric, sulfuric, or nitric acid plants
- Petroleum refineries
- Lime plants
- Phosphate rock processing plants
- Coke oven batteries
- Sulfur recovery plants
- Carbon black plants (furnace process)
- Primary lead smelters
- Fuel conversion plants
- Sintering plants
- Secondary metal production plants
- Chemical process plants
- Fossil-fuel boilers (or combination thereof) totaling more than 250 million BTU per hour heat input
- Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels
- Taconite ore processing plants
- Glass fiber processing plants
- Charcoal production plants
- Fossil fuel-fired steam electric plants of more than 250 million BTU per hour rated heat input

Any other stationary source category which, as of August 7, 1980, is being regulated under Section 111-Standards Of Performance For New Stationary Sources of the Act or under Section 112-National Emission Standards For Hazardous Air Pollutants of the Act.

New Source Performance Standards 40 CFR 60

Source	Subpart	Affected Facility	Proposed Date
Phosphate rock plants	NN	Grinding, drying and calcining facilities	09/21/79
Ammonium sulfate manufacture	PP	Ammonium sulfate dryer	02/04/80
Fossil-fuel fired steam generators for which construction is commenced after 08/17/71 and before 09/19/78	D	Utility and industrial (coal, oil, gas, wood, lignite)	08/17/71
Elect. utility steam generating units for which construction is commenced after 09/18/78	Da	Utility boilers (solid, liquid, and gaseous fuels)	09/19/78
Municipal incinerators ($\geq$ 50 tons/day)	E	Incinerators	08/17/71
Portland cement plants	F	Kiln, clinker cooler	08/17/71
Nitric acid plants	G	Process equipment	08/17/71
Sulfuric acid plants	H	Process equipment	08/17/71
Asphalt concrete plants	I	Process equipment	06/11/73
Petroleum refineries	J	Fuel gas combustion devices Claus sulfur recovery	06/11/73
Storage vessels for petroleum liquids construction after 06/11/73 and prior to 05/19/78	K	Gasoline, crude oil, and distillate storage tanks $\geq$ 40,000 gallons capacity	06/11/73
Storage vessels for petroleum liquids construction after 05/18/78	Ka	Gasoline, crude oil, and distillate storage tanks $\geq$ 40,000 gallons capacity, vapor pressure $\geq$ 1.5	05/18/78
Secondary lead smelters and refineries	L	Blast and reverberatory furnaces, pot furnaces	06/11/73
Secondary brass and bronze ingot production plants	M	Reverberatory and electric furnaces and blast furnaces	06/11/73
Iron and steel mills	N	Basic oxygen process furnaces (BOPF) Primary emission sources	06/11/73
Sewage treatment plants	O	Sludge incinerators	06/11/73
Primary copper smelters	P	Roaster, smelting furnace, converter dryers	10/16/74
Primary zinc smelters	Q	Roaster sintering machine	10/16/74
Primary lead smelters	R	Sintering machine, electric smelting furnace, converter Blast or reverberatory furnace, sintering machine discharge end	10/16/74

Source	Subpart	Affected Facility	Proposed Date
Primary aluminum reduction plants	S	Pot lines and anode bake plants	10/23/74
Primary aluminum reduction plants 111(d)		Pot lines and anode bake plants	04/11/79
Phosphate fertilizer industry	T U V W X	Wet process phosphoric Superphosphoric acid Diammonium phosphate Triple superphosphate products Granular triple superphosphate products	10/22/74
Coal preparation plants	Y	Air tables and thermal dryers	10/24/74
Ferroalloy production facilities	Z	Specific furnaces	10/21/74
Steel plants: electric arc furnaces	AA	Electric arc furnaces	10/21/74
Kraft pulp mills	BB	Digesters, lime kiln recovery furnace, washer, evaporator, strippers, smelt and BLO tanks Recovery furnace, lime, kiln, smelt tank	09/24/76
Glass manufacturing plants	CC	Glass melting furnace	06/15/79
Grain elevators	DD	Truck loading and unloading stations, barge or ship loading and unloading stations railcar loading and unloading stations, and grain handling operations	01/13/77
Stationary gas turbines	GG	Each gas turbine	10/03/77
Lime manufacturing plants	HH	Rotary kiln, hydrator	05/03/77
Degreasers (organic solvent cleaners)	JJ	Cold cleaner, vapor degreaser, conveyorized degreaser	06/11/80
Lead acid battery manufacturing plants	KK	Lead oxide production grid casting, paste mixing, three-process operation and lead reclamation	01/14/80
Automobile and light-duty truck surface coating operations	MM	Prime, guide coat, and top coat operations at assembly plants	10/05/79

National Emission Standards for Hazardous Air Pollutants 40 CFR 61

Pollutant	Subpart	Affected Facility	Promulgated Date
Beryllium	C	Extraction plants, ceramic plants, foundries, incinerators, propellant plants, machining operations	04/06/73
Beryllium, rocket motor firing	D	Rocket motor firing	04/06/73
Mercury	E	Ore processing, chloralkali manufacturing, sludge incinerators	04/06/73
Vinyl chloride	F	Ethylene dichloride manufacture via 02 HC1, vinyl chloride manufacture, polyvinyl chloride manufacture	10/21/76
Asbestos	M	Asbestos mills; roadway surfacing (asbestos tailings); demolition; spraying, fabrication, waste disposal and insulation.	04/06/73
		Manufacture of shotgun shells, renovation, fabrication, asphalt concrete, products containing asbestos	06/19/78